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EXAMINER

WILKINS III, HARRY D

ART UNIT

PAPER NUMBER

1742

DATE MAILED: 02/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/943,150

Applicant(s)

DELUCA ET AL.

Examiner

Harry D Wilkins, III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 12-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 24-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. Claims 1-26 are pending. Claims 12-23 are withdrawn from consideration as being drawn to a non-elected invention.
2. The rejections under 35 USC 102 and 103 based on the Erickson reference have been withdrawn in view of Applicant's remarks regarding the pressure of the HIP treatment.
3. The rejection under 35 USC 112, 2<sup>nd</sup> paragraph has been withdrawn in view of the amendment of claims 4 and 11.
4. The objection to claims 4 and 10 is withdrawn in view of the amendment of those claims.
5. New grounds of rejection are presented below.

### ***Election/Restrictions***

6. Applicant's election without traverse of group I, claims 1-11 and 24-26 in Paper No. 5 is acknowledged.

### ***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 4 and 11 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The term "octet shaped", in regards to the shape of the

large  $\gamma'$  particles, was not used in the prior art to describe the shape of a  $\gamma'$  phase. It is also unclear from the micrographs exactly what the shape of the large  $\gamma'$  particles is as none of the particles in figure 3 appear to be octet shaped. The examiner searched for references to octet shaped  $\gamma'$  phases, and found none. From "Nickel, Cobalt, and Their Alloys" on page 302, the  $\gamma'$  phase is described as being of shapes such as spherical, globular, block and cuboidal. Further explanation of the meaning of the term "octet shaped" is requested.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-11 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Erickson (US 5,366,695) in view of Kenton (US 4,302,256).

Erickson teaches (see abstract and title) a single crystal nickel-based superalloy that contains 1.8-4.0 wt% Cr, 0.25-2.0 wt% Mo, 3.5-7.5 wt% W, 5.0-7.0 wt% Re, 7.0-10.0 wt% Ta, 5.0-7.0 wt% Al, 1.5-9.0 wt% Co, 0-0.15 wt% Hf, 0-0.5 wt% Nb (columbium), 0.1-1.2 wt% Ti and the balance Ni. Erickson further teaches (see col 2, lines 44-56) that the alloy may contain 0-0.04 wt% C, 0-0.01 wt% B, 0-0.01 wt% Zr and 0-0.1 wt% V. This composition overlaps the presently claimed range at 3.0-4.0 wt% Cr, 0.25-2.0 wt% Mo, 3.5-7.5 wt% W, 5.0 wt% Re, 7-10 wt% Ta, 5-7 wt% Al, 1.5-9.0 wt% Co, 0-0.04 wt% C, 0-0.01 wt% B, 0-0.01 wt% Zr, 0-0.15 wt% Hf, 0-0.5 wt% Nb, 0-0.1

wt% V and 0.1-0.7 wt% Ti. Regarding the presence of at least one of Ru, Rh, Pd, Os, Ir and Pt, the present claim recites a range of “up to 10 wt%” which includes zero addition of the element. Erickson teaches (see table 4) that the process includes a step of solutionizing wherein up to 100% of the  $\gamma'$  is taken into solution. Thus, the superalloy of Erickson is free from eutectic  $\gamma - \gamma'$ .

Though Erickson teaches (see col 37, lines 55-58) that the alloy is subjected to HIP (hot isostatic pressing) in order to facilitate “nearly complete pore closure” Erickson does not teach a step of HIPing that is at a pressure similar to that of the present invention. The “nearly complete pore closure” of Erickson does not mean pore-free.

Kenton teaches (see abstract) a method of removing cast defects, such as micropores, in superalloys by subjecting the alloy to an HIP treatment. Kenton teaches (see col 5, lines 58-68) that the HIP treatment occurs at 1800-2350°F at 5-50 ksi. This treatment improves the mechanical properties of the alloy, including (see col 5, line 68 to col 6, line 17) the substantially complete removal of defects such as micropores.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the HIP treatment of Kenton to the alloy of Erickson because the HIP treatment of Kenton improves the mechanical properties of the alloy by removing casting defects such as pores (see abstract and col 5, line 68 to col 6, line 17). Thus, the alloy of Erickson in view of Kenton is pore-free.

Regarding claims 2, 6 and 24, Erickson teaches (see col 11, line 63 to col 12, line 21) that the alloy is treated to produce primary gamma prime particles and also

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secondary gamma prime particles with an ultra-fine size. Thus, Erickson teaches an alloy with a gamma prime morphology with a bimodal  $\gamma'$  distribution.

Regarding claim 3, one of ordinary skill in the art would have expected the bimodal  $\gamma'$  distribution to have a uniform distribution of large  $\gamma'$  precipitates in a continuous gamma matrix and a uniform distribution of fine  $\gamma'$  particles as claimed because a uniform distribution is desirable in terms of homogeneity of properties across an object.

Regarding claim 4, Erickson does not expressly teach the size or shape of the gamma prime precipitates. However, given the teaching of Erickson (see col 11, line 66 to col 12, line 21), it would have been within the expected skill of a routineer in the art to adjust the primary gamma prime aging condition in order to obtain a desirable gamma prime particle size such as 1.0-20 $\mu\text{m}$  as claimed. Erickson defines that the small gamma prime particles have an "ultra-fine" size. It is a general definition in the art that "ultra-fine" means sizes in the sub-micron range. Therefore, Erickson teaches that the small gamma prime particles have a size of less than 1 $\mu\text{m}$ , such as 0.45-0.55 $\mu\text{m}$  as claimed. It would have been within the expected skill of a routineer in the art to adjust the primary gamma prime aging condition in order to obtain a desirable shape for the large and small gamma prime particles such as octet and cuboidal, respectively, as claimed.

Regarding claim 5, Erickson teaches (see title) that the superalloy is a single crystal.

Regarding claim 7, see paragraph above about the size of the large gamma prime particles.

Regarding claims 8 and 9, Erickson does not expressly teach the amount of large gamma prime particles present. However, given the teaching of Erickson (see col 11, line 66 to col 12, line 21), it would have been within the expected skill of a routineer in the art to adjust the primary gamma prime aging condition in order to obtain a desirable amount of gamma prime particles such as 25-50 vol% or 27-45 vol% as claimed.

Regarding claim 10, see paragraph above about the size of the large and small gamma prime particles.

Regarding claim 11, Erickson does not expressly teach the shape of the large and small gamma prime particles. However, given the teaching of Erickson (see col 11, line 66 to col 12, line 21), it would have been within the expected skill of a routineer in the art to adjust the primary gamma prime aging condition in order to obtain a desirable shape for the large and small gamma prime particles such as octet and cuboidal, respectively, as claimed.

Regarding claim 25, see paragraph above about the size of the large and small gamma prime particles.

Regarding claim 26, see above regarding claims 1 and 24.

### ***Response to Arguments***

11. Applicant's arguments with respect to claims 1-11 and 24-26 have been considered but are moot in view of the new ground(s) of rejection.

12. Applicant's arguments filed 30 December 2002 have been fully considered but they are not persuasive. Applicant argued that Erickson only "occasionally" achieves complete solution of the  $\gamma'$  phase. In response, applicant admits that alloy 10D of Erickson is within the claimed composition and that it *can* achieve a 100% solutionization of the  $\gamma'$  phase. Therefore, Erickson teaches an alloy with the claimed composition that is eutectic  $\gamma$ - $\gamma'$  free. A complete solutionizing of the  $\gamma'$  phase would be an indication that the alloy was eutectic  $\gamma$ - $\gamma'$  free. Applicant also argues that there is no teaching in Erickson that would lead one of ordinary skill in the art to achieve the claimed particle shapes and sizes. However, Erickson expressly teaches (see col 11, line 66 to col 12, line 21) that it is within the skill of a routineer in the art to adjust the aging steps to achieve a desired shape and distribution of particles. Thus, there is a teaching that adjusting the aging steps to achieve desired results was within the skill of a routineer in the art, thereby establishing a *prima facie* case of obviousness. Applicant can overcome this rejection by showing the criticality of the processing method of the present invention in order to achieve the claimed sizes and shapes or the criticality of the claimed sizes and shapes to achieve excellent properties through comparison data.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 703-305-9927. The examiner can normally be reached on M-Th 6:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 703-308-1146. The fax phone numbers for




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the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Harry D Wilkins, III  
Examiner  
Art Unit 1742

hdw  
February 13, 2003

ROY KING   
SUPERVISORY PATENT EXAMINER  
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